TMA-301 24 Printed Pages : 4

Roll No. to be filled in your Answer Book

Roll No.

Semester: III

B.Tech Examination December 2014

Mathematics-III

Time: 3 Hours **MM. 100**

Note: Attempt all questions, the marks assigned to each question is indicated at question itself.

Q1. Attempt any four **(4X5)**

(a) Determine the analytic function whose real part is $e^{2x}(xcos2y - ysin2y)$

(b) Determine the poles and residue at each pole of the function

$$f(z) = \frac{z^2}{(z-1)^2(z+2)}$$

(c) Use residue calculus to evaluate the following integral

$$\int_0^{2\pi} \frac{1}{5-4sin\theta} d\theta$$

(d) If f (z) is an analytic function with constant modulus, show that f(Z) is a constant

(e) Show that the function $f(z) = \sqrt{|xy|}$ is not regular at the origin, although C-R equations are satisfied.

(f) Find the Laurent's series which represent the function $\frac{z^2-4}{(z+1)(z+4)}$ when $1<|z|<4$

Q2. Attempt any four **(4X5)**

(a) Fit a second degree parabola in the following data by least square method :

X	0	1	2	3	4
Y	1	4	10	17	30

(b) The following data regarding the heights (y)and weights (x) of 100college students are given :
$\sum x = 150000 \quad \sum x^2 = 2272500, \quad \sum y = 6800,$
$\sum y^2 = 463025$, and $\sum xy = 1022250$.
Find the equation of regression line of height on weight.

(c) Fit the curve $y = ax + \frac{b}{x}$ to the following data:

x	1	2	3	4	5	6
y	1200	900	600	200	110	50

(d) Find the first four moments about the mean of the following data:

X	0	1	2	3	4	5	6	7	8
F	1	8	28	56	70	56	28	8	1

(e) Find the Carl Pearson's coefficient of skewness for the following data:

Weight (lbs)	12.5	17	13-17	18-22	23-27	28-32	33-37	38-42
NO. of persons	2	108	580	175	80	32	18	5

(f) The two regression equation of the variable x and y are x=19.13-0.87y and y=11.64-.50x

Find regression coefficient and also regression line coefficient

Q3. Attempt any two (2X10)

(a) The arrival rate of the customers arriving at a bank follows Poison Distribution with a mean arrival rate of 4 per 10 minutes interval. Find the probability that

i. Exactly 0 customer will arrive in 10 minutes interval
ii. Exactly 2 customer will arrive in 10 minutes interval
iii. At most 2 customer will arrive in 10 minutes interval
iv. At least 2 customer will arrive in 10 minutes interval

(b) In a lot of 200 articles 10 are defective find the probability of (i) no defective article (ii) one defective article (iii) at least one defective article, in a random sample of 20 articles

(c) The weight of a drug produced by Ganga Pharmaceutical Co. follows normal distribution. The specified variance of the weight of the drug of this population is 0.25 mg. the quality engineer of the firm claims that the variance of the weight of the drug does not differ significantly from the specified variance of the weight of the drug of the population. So, the purchase officer of the Alpha Hospital who places order for that drug with the Ganga Pharmaceutical Co. has selected a random sample of 12 drugs. The variance of the weight sample is found to be 0.49 mg. verify the intuitions of the quality manager of Ganga Pharmaceutical Co. at a significance level of 0.10 using Chi Square. (Tabulated chi square value is 19.675 with 11 dof)

Q4. Attempt any two **(2X10)**

(a) Find the positive real root of $x\log_{10} x=1.2$ using" Regula Falsi methods" .Also find the rate of Convergence for" Regula Falsi methods"

(b) Find the cubic polynomial by the Newton's divided formula which takes the following values

X	300	304	305	307
F(x)	2.4771	2.4829	2.4843	2.4871

(c) Find tan (16^0) from the Gauss forward method:

X	0	5	10	15	20	25	30
tan(x)	0	0.0875	0.1763	0.2679	0.3640	0.4663	0.5774

Q5.Attemt any two **(2x10)**

(a) Apply the Runga –Kutta method of fourth order to find approximate value of y for x=0.1 and 0.2 if $\frac{dy}{dx}=\frac{4x}{y}-xy$,given that $y_0=3$ where $x_0=0$.

(b) Using the Gauss Seidel method, solve the following equation: x+4y-z=-5; x+y-6z=-12; 3x-y-z=4

(c) Find $\int_0^6 \frac{e^x}{1+x}dx$

(A) By the Simpson's $1/3^{rd}$ method.

(B) (B) By the Simpson's $3/8^{th}$ method